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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/705,166	11/01/2000	Zhimin Liu	13854-001001	4721

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EXAMINER

KIANNI, KAVEH C

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/705,166

Applicant(s)

LIU, ZHIMIN

Examiner

Kevin C Kianni

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 and 12-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 12-20 is/are rejected.
- 7) ☒ Claim(s) 9 and 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 17 December 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 16-20 are objected to because of the following informalities: claims 16-20 are renumbered as claims 17-21. Appropriate correction is required.

### **Reason for Allowance**

2. Claims 9-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The reason for the allowability of claims 9-10 is that the prior art, in combination with the other limitations of the base claim, does not teach wherein a reflective means for reflecting a portion of said collimated beams as second group of parallel beams transmitted along a second optical path away from said collimated parallel beams; a third collimating lens for focusing said second group of parallel beams into a second output optical fiber; and a second phase delay difference generating means for generating a second phase-delay difference between portions of said second group of parallel beams for generating an interference in said third collimating lens for selectively enhance signal transmission of a second set of wavelengths outputting from said second optical fiber.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8 and 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over combination of Podoleanu et al. (US 5975697) and Krol et al. (US 6370286).

Regarding claims 1 and 6-8, Podoleanu teaches an optical interleaver (shown at least in fig. 17; also see also col. 10, lines 40-47) comprising: a first collimating lens 17 for collimating an input optical signal into collimated beams (see col. 17, item collimated beams output from the lens 75) and a second collimating lens 136 for focusing said collimated parallel beams into an output optical fiber (see fig. 17, item lens 136 focusing collimated beams into fiber 41); and a phase delay difference generating means for generating substantially one phase-delay difference between portions of said collimated parallel beams (see fig. 17, item 132; also col. 18, lines 14-30 and col. 10, lines 55-57), wherein the phase delay difference generating means is configured to generate an interference pattern (see col. 17, line 64-col. 18, line 12 and col. 7, lines 57-67; wherein the phase delay 132 plates generate beam patterns that have substantially same power). Podoleaun further teaches a set of cascaded interferometer, with phase delay plate 132/124 and a pair of collimating lenses 75/136, for generating a series of band-pass signal transmissions (shown at least in fig. 15-18, wherein the signals are generated are band-pass signal transmission see col. 7, lines 57-67) and a pair of lenses.

However, podoleanu does not specifically teach (a) that the above underlined interference pattern that is generated by the phase delay is substantially periodic and

(b) interferometer is of mach-zender interferometer and (c) the lens is of half-pitch GRIN lens. Regarding using half-pitch GRIN lens it would have been obvious to a person of ordinary skill in the art when the invention was made to replace Podoleanu's lens 75/136 with that of a conventional half-pitch GRIN lens (see US 6018603 provided herein as prior art) in order to produce an optical system that includes that above limitations, since such interferometer system would provide high resolution output signals that can be used in verity of applications such as high resolution imaging (see col. 7, lines 22-29); other limitations (a) and (b) are more specifically taught by Krol (see at least fig. 1, items delay generators 43 or/and 39 and see abstract; also see col. 1, lines 24-26). Thus, Krol provides tuning the transmission spacing of the optical signals (see col. 1, lines 12-14). Thus, it would have been obvious to a person of ordinary skill in the art when the invention was made to modify Podoleanu 132 or 124/122 with that of Krol's 39/43/21 in order to produce an optical interference delay generation that includes above limitations, since the resultant optical system would provide high resolution output signals that can be used in verity of applications such as high resolution imaging (see col. 7, lines 22-29).

Regarding claim 2, as stated in rejection of claim 1, Podoleanu further teaches wherein: said phase delay difference generating means comprising a glass plate blocking a portion of said collimated parallel beams for generating a phase delay for a portion of said collimated parallel beams passing therethrough (see fig. 17, item 32; also col. 17, line 64-col. 18, line 8).

Regarding claim 3, as stated in rejection of claim 1, Podoleaun further teaches said phase delay difference generating means comprising a glass plate having an upper portion covering an upper portion of said collimated parallel beams and said glass plate having a lower portion covering a lower portion of said collimated parallel beams for generating a phase delay difference between said upper portion and lower portion of said collimated parallel beams (shown in fig. 16-17, item 122/132; wherein the phase delay generating means glass plate 124/132, of element optical path difference (OPD) 112 shown in fig. 15-17, covers upper/lower portion of the parallel beams discussed in col. 17, line 40-12)

Regarding claim 4, as stated in rejection of claim 1, Podoleaun further teaches a control means for controlling said phase delay difference generating means for selectively generating signal transmission at different wavelengths according to said interference generated in said second collimating lens (see col. 10, lines 55-58 and col. 6, lines 1-6; wherein the interference as seen in fig. 17, is generated at lens 136 using interference generator 132).

Regarding claim 5, as stated in rejection of claim 1, Podoleaun further teaches said phase delay difference generating means 132 comprising a glass plate having a plurality predefined segments with different combination of plate-thickness and diffraction index wherein said phase delay difference generating means (see col. 18,

lines 17-30) is controlled by said control means for selectively generating signal transmission at different wavelengths with a predefined program (see col. 10, lines 55-58 and col. 6, lines 1-6; wherein the interference as seen in fig. 17, is generated at lens 136 using interference generator 132).

Regarding claim 12, as stated in rejection of claim 1, Podoleaun further teaches control means for controlling said phase difference generating means controlling a selection of certain wavelengths for enhanced signal transmission (see col. 10, lines 55-58 and col. 6, lines 1-6; wherein the interference as seen in fig. 17, is generated at lens 136 using interference generator 132).

Regarding claim 13, as stated in rejection of claim 1, Podoleaun further teaches wherein said phase difference generating means 132 further comprising an optical element for transmitting optical beams therethrough (see fig 17 item 132).

Regarding claim 14, as stated in rejection of claim 13, Podoleaun further teaches said phase difference generating means further comprising said optical element for transmitting optical beams therethrough with at least two portions of different thicknesses (see col. 18, lines 17-30).

Regarding claim 15, as stated in rejection of claim 13, Podoleaun further teaches

optical element for transmitting optical beams therethrough with at least two portions of different diffraction indexes (shown at least in fig. 16-17, item(s) 132, or 124 and 122, wherein these items generate different diffraction indexes).

Regarding claim 16, 18 and 20, Podoleaun teaches a method for configuring an optical interleaver (shown at least in fig. 17; also see also col. 10, lines 40-47) comprising: providing a first collimating lens for collimating an input optical signal into collimated beams and a second collimating lens for focusing said collimated parallel beams into an output optical fiber (shown in fig. 17 and 18, items optical lenses 132 each receiving focused beams from the previous lens and focusing the resultant optical beam into optical fiber 41); and employing a phase difference generating means 132 for generating a phase difference between different portion of optical beams (shown in fig. 17, item 132); and generating an interference pattern (see col. 17, line 64-col. 18, line 12 and col. 7, lines 57-67; wherein the phase delay 132 plates generate beam patterns that have substantially same power) and for selecting a plurality of single-wavelength signals in the optical beams (see col. 9, line 62-col. 10, line 5+ and col. 12, line 58-col. 13, line 3+). Podoleaun further teaches wherein said phase difference generating means 132 further comprising an optical element for transmitting optical beams therethrough (see fig 17 item 132); said phase difference generating means further comprising said optical element for transmitting optical beams therethrough (see col. 18, lines 17-30).



However, podoleanu does not specifically teach wherein the above different thickness plates have different diffraction indexes. It is well known to those of ordinary skill in the art that glass plates such as lenses with different thickness/sizes have different diffraction indexes, since such plates in the interferometer system would provide high resolution output signals that can be used in variety of applications such as high resolution imaging (see col. 7, lines 22-29). Regarding the above underlined interference pattern to be periodic, the arguments presented in rejection of claim 1, is analogous in rejection of claim 16.

Regarding claims 17 and 19, the arguments presented in rejection of claims 12 and 14, above, are analogous in rejection of claims 17 and 19.

#### ***Citation of Relevant Prior Art***

5. Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:

Lundgren et al. 6018603 teaches  $\frac{1}{2}$  pitch GRIN lens

Fournier et al. 4786173 teaches interference pattern to be periodic (using a delay generation)

Tachikawa 6303900 teaches interference pattern to be periodic (using a delay generation)

Kulesh et al. 4558952 teaches interference pattern to be periodic (using a delay generation)

These references are cited herein to show the relevance of the apparatus/methods taught within this reference as prior art.

***Response to Amendment***

6. Applicant's arguments filed on 12/17/02 have been fully considered, and thus has provided with new reference(s) to overcome applicant's amendment and/or arguments.

**THIS ACTION IS MADE FINAL**

7. This action as a result of applicant's amendments made FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Contact Information***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaveh Cyrus Kianni whose telephone number is (703) 308-1216. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 6:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font, can be reached at (703) 308-4881.

**Any response to this action should be mailed to:**

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**or faxed to:**

(703) 308-7722, (for formal communications intended for entry)

**or:**

(703) 308-7721, (for informal or draft communications, please label  
"PROPOSED" or "DRAFT")

Hand delivered responses should be brought to Crystal Plaza 4, 2021 South  
Clark Place, Arlington, VA., Fourth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be  
directed to the Group Receptionist whose telephone number is (703) 308-0956.

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